

NON-PUBLIC?: N  
ACCESSION #: 9110080197  
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Oyster Creek, Unit 1 PAGE: 1 OF 05

DOCKET NUMBER: 05000219

TITLE: Automatic Reactor Scram Due to Loss of Feedwater Flow Caused by a  
Grounded Condensate Pump Motor  
EVENT DATE: 08/22/91 LER #: 91-005-00 REPORT DATE: 09/23/91

OTHER FACILITIES INVOLVED: N/A DOCKET NO: 05000

OPERATING MODE: N POWER LEVEL: 100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR  
SECTION:

50.73(a)(2)(iv)

OTHER - Voluntary

LICENSEE CONTACT FOR THIS LER:

NAME: Donald J. Sheehan TELEPHONE: (609) 971-2496

COMPONENT FAILURE DESCRIPTION:

CAUSE: B SYSTEM: SD COMPONENT: MO MANUFACTURER: G080

REPORTABLE NPRDS: Y

SUPPLEMENTAL REPORT EXPECTED: No

ABSTRACT:

On August 22, 1991, at 0306 hours, a reactor scram occurred due to low reactor water level. The cause of the low reactor water level was a loss of feedwater flow due to a main feed pump trip on low suction pressure. The root cause of this event was a grounded condensate pump motor which led to a condensate pump trip while the plant was operating above 80% power. The motor was replaced.

The shrink in reactor water level caused by the scram and the reduction in feedwater flow caused reactor water level to reach the double low Reactor Protection System (RPS) setpoint which actuated appropriate Engineered Safety Features.

A second event being reported is a procedure violation which occurred at 1012 hours. While plant cooldown to cold shutdown conditions was in

progress, all five reactor recirculation discharge valves were shut simultaneously with reactor temperature above 212 degrees F. The plant achieved cold shutdown at approximately 1800 hours.

END OF ABSTRACT

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Date of Occurrence

The events occurred on August 22, 1991, at 0306 and 1012 hours.

Identification of Occurrence

On August 22, 1991, at 0306 hours, the reactor automatically scrammed due to a reactor low water level signal from the Reactor Protection System (RPS, EIIS JC) caused by a loss of main feedwater system (EIIS SJ) flow. Reactor water level reached the double low level setpoint during the transient. This resulted in actuation as designed of appropriate Engineered Safety Features (EIIS JE). This event is reportable in accordance with 10 CFR 50.73 (a)(2)(iv).

At 1012 hours, all five reactor recirculation system (EIIS AD) discharge valves (EIIS ISV) were closed contrary to the requirements of written plant operating procedures. This second event is being included as a voluntary report.

Conditions Prior To Occurrence

Prior to the scram the reactor was operating at 1925 megawatts-thermal (99.8% of full power), with a generator load of 644 megawatts-electric.

At the time of the reactor recirculation discharge valve closure, the reactor pressure was 110 psig, the reactor temperature was 344 degrees F, and reactor water level was greater than 185 inches above the top of the active fuel (TAF).

Description of Occurrence

The reactor was operating at 99.8% of full power with all safety systems fully operable. At 0230 hours on August 22, 1991, main condenser backwash operations commenced. At 0306 hours, while coming out of backwash of the south half of "A" condenser, indications were received of "A" main condensate system (EIIS SD) pump motor (EIIS MO) circuit breaker (EIIS 52) trip. Several unsuccessful attempts were made to restart the pump.

The Lead Control Room Operator began reducing reactor power by decreasing reactor recirculation flow in anticipation of a main feed pump trip on low suction pressure. Indications of "B" main feed pump motor trip were received shortly thereafter. By 0307 hours, reactor water level had dropped from a normal level of 160 inches to a level of 137 inches TAF, generating a reactor low water level scram signal in the Reactor Protection System (RPS, EIIS JC) concurrent with a manually inserted operator scram. The main turbine and generator automatically tripped as steam flow decreased due to the reactor scram. Plant loads transferred as expected to the startup transformers, and the diesel generators idle started as designed.

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Shortly after 0307 hours, a reactor double low water level (90 inches TAF) signal was generated on both channels of RPS due to the shrink in reactor water level resulting from the reactor scram combined with reduced feedwater flow caused by the "B" main feed pump trip. This caused actuation of the following Engineered Safety Features as designed:

- Core Spray (EIIS BM) (no injection occurred)
- Standby Gas Treatment/Secondary Containment Isolation (EIIS BH)
- Reactor Recirculation Pump Trips (EIIS JE)
- Diesel Generator Idle Start (EIIS EK)
- Alternate Rod Injection Initiation (EIIS JE)
- Isolation Condenser Initiation (EIIS BL)
- Reactor Isolation (Main Steam Isolation Valve closure) (EIIS BD)

By 0308 hours, reactor water level was restored and maintained between 138 and 175 inches TAF. The associated alarms cleared as expected. Systems that initiated as a result of the reactor double low water level signal were subsequently returned to normal. The isolation condensers (EIIS BL) were used to control the cooldown of the reactor until the shutdown cooling system (EIIS BN) could be placed into service. The oncoming Group Shift Supervisor (GSS) knew that closing all five reactor recirculation discharge valves would provide for better core cooling, however, he overlooked the associated procedural requirement that reactor water temperature must be below 212 degrees F prior to closing all five reactor recirculation discharge valves. At 0930 hours, the shutdown cooling system was placed into service and at 0944 hours the isolation condenser valves were closed. By 1001 hours reactor water level had been increased to greater than 185 inches TAF.

At 1012 hours, the fifth reactor recirculation discharge valve was closed while reactor water temperature was 344 degrees F, in violation of

written operating procedures. At 1013 hours, the procedural violation was recognized, and one of the reactor recirculation discharge valves was opened. Oyster Creek, Technical Specification 3.3.F.4 requires that: "With reactor coolant temperature greater than 212 degrees F... at least one recirculation loop and discharge valve and its associated suction valve shall be in the full open position..." However, if Technical Specification 3.3.F.4 is not met, immediately open one recirculation loop discharge valve, and its associated suction valve." As a recirculation discharge valve was opened approximately one minute after the fifth discharge valve was closed, no violation of the technical specifications occurred. The plant achieved cold shutdown conditions at approximately 1800 hours on August 22, 1991.

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#### Apparent Cause of Occurrence

The reactor low water level signal from RPS was the result of a feedwater pump trip on low suction pressure. The low suction pressure condition was caused by a trip of a condensate pump due to a ground in its motor winding.

The reactor double low water level RPS signal was caused by reactor water level shrink from the scram combined with the loss of "B" main feed pump.

The closure of all five reactor recirculation discharge valves with reactor coolant temperature above 212 degrees F, is attributed to personnel error on the part of the operating crew. They failed to adequately review procedural limitations on the simultaneous closure of all five reactor recirculation discharge valves while reactor water temperature was above 212 degrees F.

#### Analysis of Occurrence and Safety Assessment

The reactor low water level scram setting of 137 inches TAF has been established to ensure that the reactor is not operated at a water level below that for which the fuel cladding integrity safety limit is applicable. With the reactor scram set at this level, the generation of steam (and thus the loss of water inventory) is significantly reduced. In this event, a reduction in feedwater flow caused a reactor scram at the level specified and Main Steam Isolation Valve closure at the reactor double low water level setpoint. During this event all Engineered Safety Features operated as designed which maintained sufficient water level to ensure adequate margin to the fuel cladding integrity safety limit. Based upon the above discussion, the safety significance of the scram event is considered minimal.

There is a procedural requirement that at least one reactor recirculation discharge valve be open above a reactor coolant temperature of 212 degrees F in order to ensure adequate hydraulic communication and flow of coolant between the annulus and core regions. During the discharge valve closure event, reactor water level remained above 185 inches TAF thus ensuring direct hydraulic communication between the annulus and core regions. All five reactor recirculation loop suction valves, as well as all five of the associated reactor recirculation loop two-inch discharge bypass valves, remained open thus ensuring a limited hydraulic communication and flow path between the annulus and core regions. The shutdown cooling system was also operating, thus providing additional hydraulic communication between the annulus and core regions. For the conditions that existed on August 22, 1991, the hydraulic communication through the five two-inch reactor recirculation discharge bypass valves would have supported the necessary flow rates to ensure consistent water levels in the annulus and core regions, even with a postulated loss of the shutdown cooling system.

Based upon the above discussion, the safety significance of closing the fifth reactor recirculation discharge valve is considered minimal.

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#### Corrective Action

The Post Transient Review Group was convened to review the scram event. The review determined that the plant's Engineered Safety Features responded as designed. Operator action in an attempt to prevent the loss of feedwater (and subsequent scram), as well as actions taken to control the plant immediately following the scram, were appropriate and in accordance with written plant operating procedures. Corrective actions for the scram event and subsequent double low water level RPS signals being generated consisted of determining the cause of the event. The grounded condensate pump motor was determined to be the cause of the scram; it was subsequently replaced with another motor and the plant was restarted and returned to full power.

With respect to the closure of the five reactor recirculation discharge valves above 212 degrees F, immediate corrective actions were taken to reopen one of the discharge valves within one minute of the closure of the fifth and final discharge valve. An independent review group was formed and an extensive evaluation of the recirculation discharge valve event was conducted. Several potential corrective actions were identified. GPU Nuclear is presently reviewing the report to determine if long term corrective actions for the discharge valve event would be

appropriate.

To minimize the challenges to the operators and the plant during these types of events, Operations Management will re-emphasize the necessity of strict procedural compliance with all Control Room personnel. Additionally, the need to review requisite plant procedures prior to the performance of plant evolutions will be stressed. These actions will be completed prior to November 30, 1991.

#### Similar Events

LER 87-029 High Reactor Pressure Scram Due to Air Leak  
LER 87-035 Reactor Scram Due to Degraded Cable  
LER 85-006 Reactor Scram due to Low Water Level Nuclear

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GPU Nuclear GPU Nuclear Corporation  
Post Office Box 388  
Route 9 South  
Forked River, New Jersey 08731-0388  
609 971-4000  
Writer's Direct Dial Number:

September 23, 1991  
C321-91-2261

U.S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
Washington, DC 20555

Dear Sir:

Subject: Oyster Creek Nuclear Generating Station  
Docket No. 50-219  
Licensee Event Report

This letter forwards one copy of Licensee Event Report 91-005.

Sincerely,

John J. Barton  
Vice President and Director  
Oyster Creek

JJB/JR:jc

(Covltrs)  
Enclosure

cc: Administrator, Region I  
Senior NRC Resident Inspector  
Oyster Creek NRC Project Manager

GPU Nuclear Corporation is a subsidiary of  
General Public Utilities Corporation

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